

Twenty-five to 30 percent of these escaped detection (especially midline tumors).

A practical and useful application is the differential diagnosis of primary or metastatic brain tumors from cerebral infarcts since the latter are much less likely to concentrate gallium than tumors.

It is now generally recognized that gallium uptake is not tumor specific. Foci of inflammation will also show gallium accumulation. This uptake may be very rapid and pronounced. Therefore, gallium scanning has been useful in the search for occult infections.

Gallium scanning is no panacea for tumor detection but it is useful selectively to answer specific questions. Despite the pitfalls, valuable clinical information can be obtained in a non-invasive fashion and in special instances a gallium scan may be the *only* test of merit.

ALAN D. WAXMAN, MD  
JAN K. SIEMSEN, MD

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## Noninvasive Radionuclide Imaging of Damaged Myocardial Tissue

DURING THE LAST two years, it has become apparent that imaging of damaged myocardial tissue, including acute myocardial infarcts, can be accomplished following an intravenous injection of an appropriate radionuclide. The technique, first described by Bonte and co-workers, utilizes an intravenous injection of 15 millicuries of radioactive technetium (<sup>99m</sup>Tc) stannous pyrophosphate, a commonly used bone scanning agent. In a series of patient studies, <sup>99m</sup>Tc stannous pyrophosphate was clearly shown to localize in an area of acute myocardial infarction, the location of which correlated well with electrocardiogram (ECG) localization.

The mechanism of incorporation of the <sup>99m</sup>Tc stannous pyrophosphate into infarcted tissue is thought to be related to the presence of calcium phosphate crystals found within the mitochondria of irreversibly damaged myocardial cells.

Results of animal studies showed that an ex-

perimental infarct is imageable at approximately 12 to 16 hours after the infarct, with no change in localization of the radionuclide for up to six days following the infarct. Attempts to image after six days showed that the uptake of the radionuclide in the infarct began to fade and finally disappeared. The radionuclide does not concentrate in old myocardial infarcts, so the technique might be useful in identifying superimposed acute infarction in a patient in whom findings are abnormal on an ECG. The eventual role that this procedure will play in the workup of suspected myocardial infarcts is still uncertain because the incidence of false positive and false negatives has not been established.

In addition to infarct imaging, other approaches to imaging the myocardium by radionuclide techniques are being studied. Thallium-201 is an example of another promising agent which localizes in normal myocardium but not in damaged myocardium. This agent does not distinguish between acute and chronic damage and therefore may play a complementary role to the <sup>99m</sup>Tc pyrophosphate scan. Potassium-43 and cesium-129 and rubidium-81 have been tested as indicators of myocardial perfusion but there are disadvantages to their use, such as high cost and relatively poor resolution images.

NAOMI ALAZRAKI, MD

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## The Role of Inhalation Lung Scans in the Diagnosis of Pulmonary Embolus

SINCE THE INCEPTION and development of perfusion lung scanning by Taplin, the primary indication for its use has been in suspected pulmonary embolus. The advantages of this procedure are that it is safe, noninvasive and sensitive. As with most diagnostic procedures of high sensitivity, the abnormalities lack specificity. The major pitfall in interpreting perfusion defects is that reflex pulmonary arteriolar vasospasm occurs with the slightest drop in alveolar oxygen pressure. There-